



# VR8204A,M Intermittent Pilot Combination Gas Control

## INSTALLATION INSTRUCTIONS

### APPLICATION

These intermittent pilot gas controls are used in gas-fired appliances with up to 200 cfh capacity on natural gas. They include safety shutoff, a manual valve, two automatic operators, a pressure regulator and a pilot filter.

#### Ambient Temperature Range:

VR8204A: 0° F to 175° F [-18° C to 79° C].  
VR8204M: -40° F to 175° F [-40° C to 79° C].

#### Body Pattern:

Straight through with 1/2 in. inlet and 1/2 in. outlet.

#### Pipe Adapters:

Angle and straight adapters available for 3/8, 1/2, and 3/4 in. pipe. See Table 1. Flange kits include one flange with attached O-ring, four mounting screws, a 9/64 in. hex wrench and instruction sheet.

#### Electrical Ratings:

Voltage and frequency: 24 Vac, 60 Hz.  
Current draw: 0.5 A with both operators energized.

These gas controls are factory-set for natural (and manufactured) or LP gas. *Do not attempt to use a control set for natural (manufactured) gas on LP gas, or a control set for LP on natural (manufactured) gas.*

Controls with standard regulators can be converted from one gas to the other with a conversion kit (order separately). Order Part No. 393691 to convert from natural (manufactured) to LP gas; order Part No. 394588 to convert from LP to natural (manufactured) gas.

#### Approvals

American Gas Association Design Certificate: P-70-42A.  
Canadian Gas Association Design Certificate:  
1029-CC-6395 series.  
Australian Gas Association Certificate: 4214.

Table 1. Adapter (Flange) Part Numbers.

Inlet/Outlet Pipe Size	Flange Type	Part Number
3/8 inch NPT	Straight	393690-11
	Elbow <sup>a</sup>	393690-12
1/2 inch NPT	Straight	393690-16
	Elbow <sup>a</sup>	393690-13
3/4 inch NPT	Straight	393690-14
	Elbow <sup>a</sup>	393690-15

NOTE: Elbow (angle) flanges cannot be used to provide a right hand inlet when the ECO connector is used.

## INSTALLATION

### When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. The installer must be a trained, experienced service technician.
4. After installation is complete, use these instructions to check out product operation.



## **!** WARNING

### **Fire or Explosion Hazard**

**Can cause property damage, severe injury, or death.**

Follow these warnings exactly:

1. Disconnect power supply before wiring to prevent electrical shock or equipment damage.
2. To avoid dangerous accumulation of fuel gas, turn off gas supply at the appliance service valve before starting installation, and perform Gas Leak Test after completion of installation.
3. Do not bend pilot tubing at control or pilot after compression nut has been tightened, or gas leakage at the connection may result.
4. Always install sediment trap in gas supply line to prevent contamination of gas control.
5. Do not force the gas control knob. Use only your hand to turn the gas control knob. Never use any tools. If the gas control knob will not operate by hand, call a qualified service technician to replace the gas control. Force or attempted repair can result in fire or explosion.

## **!** CAUTION

**Never apply a jumper across or short the valve coil terminals. This may burn out the heat anticipator in the thermostat or damage the electronic intermittent pilot (IP) module.**

### **IMPORTANT:**

*These gas controls are shipped with protective seals over inlet and outlet tappings. Do not remove seals until ready to connect piping.*

Follow the appliance manufacturer's instructions if available; otherwise, use the instructions provided on page 2 as a guide.

## Converting Control from Natural Gas to LP Gas Application (or LP Gas to Natural Gas Application)

## **!** WARNING

### **Fire or Explosion Hazard**

**Can cause property damage, severe injury, or death.**

Always change the main and pilot burner orifices when converting from natural to LP gas or from LP to natural gas. Follow appliance manufacturer's specifications and instructions.

Controls are factory-set for natural (and manufactured) or LP gas. Do not attempt to use a control set for natural (manufactured) gas on LP gas, or a control set for LP on natural (manufactured) gas.

Controls with standard regulators can be converted from one gas to the other with a conversion kit (order separately). Order Part No. 393691 to convert from natural (manufactured) to LP gas; order Part No. 394588 to convert from LP to natural (manufactured) gas.

## Install Adapters to Gas Control

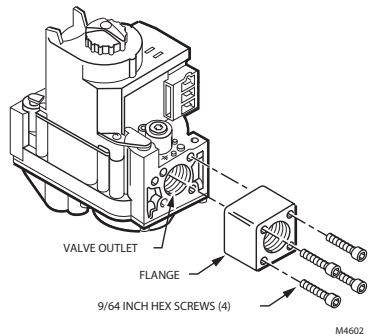
If adapters are to be installed on the gas control, mount them as follows:

### Flanges

1. Choose the appropriate flange for your application.
2. Remove seal over control inlet or outlet.
3. Check to ensure that the O-ring is fitted in the groove of the flange. If the O-ring is not attached or missing, do not use flange.
4. With O-ring facing control, line up the screw holes on the control with the holes in the flange. Insert and tighten the screws provided with the flange. See Fig. 1. Tighten the screws to 25 inch pounds of torque to provide a gas-tight seal.

### Bushings

1. Remove seal over gas control inlet or outlet.
2. Apply moderate amount of good quality pipe compound to bushing, leaving two end threads bare. On LP installations, use compound resistant to LP gas. Do NOT use Teflon tape.
3. Insert bushings in control and thread pipe carefully into bushing until tight.



**Fig. 1. Fasten flange to valve firmly, but do not overtighten screws.**

Complete installation below for piping, installing control, connecting pilot tubing and wiring. Make certain the leak test you perform on the control after completing the installation includes leak testing the adapters and screws. If you use a wrench on the valve after flanges are installed, use the wrench only on the flange, not the control.

## Location

Do not locate the combination gas control where adverse environments such as steam cleaning, high humidity or dripping water, corrosive chemicals, dust or grease accumulation, or excessive heat are prevalent.

To ensure proper operation, follow these guidelines:

- Locate in a well ventilated area.
- Mount high enough above the cabinet bottom to avoid exposure to flooding or splashing water.
- Ensure that the ambient temperature does not exceed the ambient temperature ratings for each component.
- Cover if appliance is cleaned with water, steam, or chemicals or to avoid dust and grease accumulation.
- Avoid locating where exposure to corrosive chemical fumes or dripping water is likely.

Mount the combination gas control in the appliance vestibule on the gas manifold. If this is a replacement application, mount the control in same location as old control.

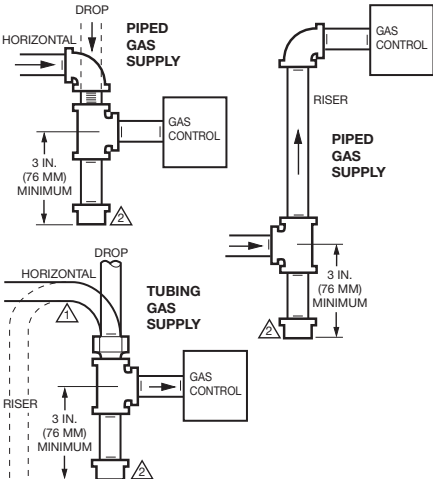
### Install Piping to Gas Control

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1 NFPA No. 54), whichever applies. Tubing installation must comply with approved standards and practices.

1. Use new, properly reamed pipe free from chips. If tubing is used, make sure the ends are square, deburred and clean. All tubing bends must be smooth and without deformation.
2. Run pipe or tubing to the control. If tubing is used, obtain a tube-to-pipe coupling to connect the tubing to the control.
3. Install sediment trap in the supply line to the gas control. See Fig. 2.

### Install Gas Control

1. This control can be mounted 0-90 degrees, in any direction, from the upright position of the gas control knob, including vertically.
2. Mount the control so gas flow is in the direction of the arrow on the bottom of the control.
3. Thread pipe the amount shown in Table 2 for insertion into control of adapter. DO NOT THREAD PIPE TOO FAR. Valve distortion or malfunction may result if the pipe is inserted too deeply.



⚠ ALL BENDS IN METALLIC TUBING SHOULD BE SMOOTH.

⚠ CAUTION: SHUT OFF THE MAIN GAS SUPPLY BEFORE REMOVING END CAP TO PREVENT GAS FROM FILLING THE WORK AREA. TEST FOR GAS LEAKAGE WHEN INSTALLATION IS COMPLETE.

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Fig. 2. Install sediment trap.

Table 2. NPT pipe thread length in (in.).

Pipe Size	Thread Pipe this Amount	Maximum Depth Pipe can be Inserted into Control
3/8	9/16	3/8
1/2	3/4	1/2
3/4	13/16	3/4

4. Apply a moderate amount of good quality pipe compound (do not use Teflon tape) to pipe only, leaving two end threads bare. On LP installations, use compound resistant to LP gas. Refer to Fig. 3.

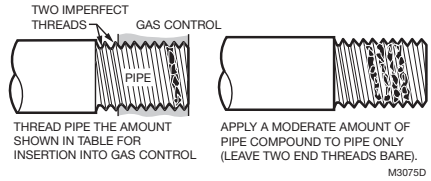


Fig. 3. Use moderate amount of pipe compound.

5. Remove seals over gas control inlet and outlet if necessary.
6. Connect pipe to gas control inlet and outlet. Use wrench on the square ends of the gas control. If a flange is used, place wrench on flange rather than on gas control. Refer to Fig. 4 and 5.

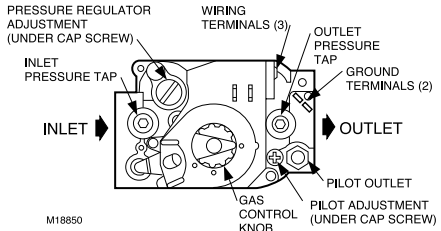


Fig. 4. Top view of gas control.

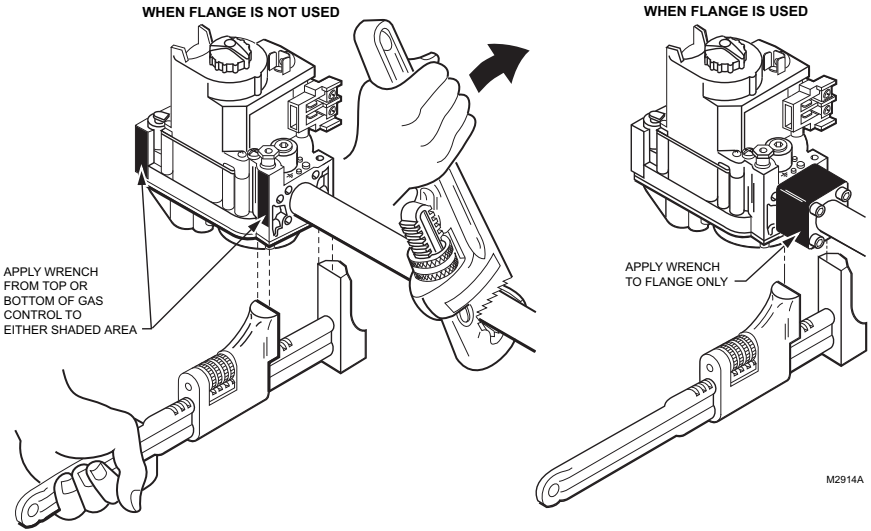


Fig. 5. Proper use of wrench on gas control with and without adapters.

### Connect Pilot Gas Tubing

1. Cut tubing to desired length and bend as necessary for routing to pilot burner. Do not make sharp bends or deform the tubing. Do not bend tubing at control after compression nut has been tightened, as this may result in gas leakage at the connection.
2. Square off and remove burrs from end of tubing.
3. Unscrew brass compression fitting from the pilot outlet (Fig. 4). Slip the fitting over the tubing and slide out of the way.

4. Push tubing into the pilot gas tapping on the outlet end of the control until it bottoms. While holding tubing all the way in, slide fitting into place and engage threads—turn until finger tight. Then tighten one more turn with wrench. Do not over-tighten.
5. Connect other end of tubing to pilot burner according to pilot burner manufacturer's instructions.

NOTE: When replacing a control, cut off old compression fitting and replace with the compression fitting provided on the combination gas control. Never use the old compression fitting as it may not provide a gas-tight seal. Refer to Fig. 6.

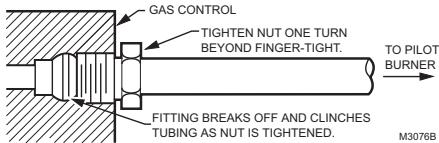


Fig. 6. Always use new compression fittings.

### WIRING

Follow the wiring instructions furnished by the appliance manufacturer, if available, or use the general instructions provided below. Where these instructions differ from the appliance manufacturer, follow the appliance manufacturer instructions.

All wiring must comply with applicable electrical codes and ordinances.

Disconnect power supply before making wiring connections to prevent electrical shock or equipment damage.

1. Check the power supply rating on the gas control and make sure it matches the available supply. Install thermostat and other controls as required.
2. Connect control circuit to gas control terminals. See Fig. 5 and 7.

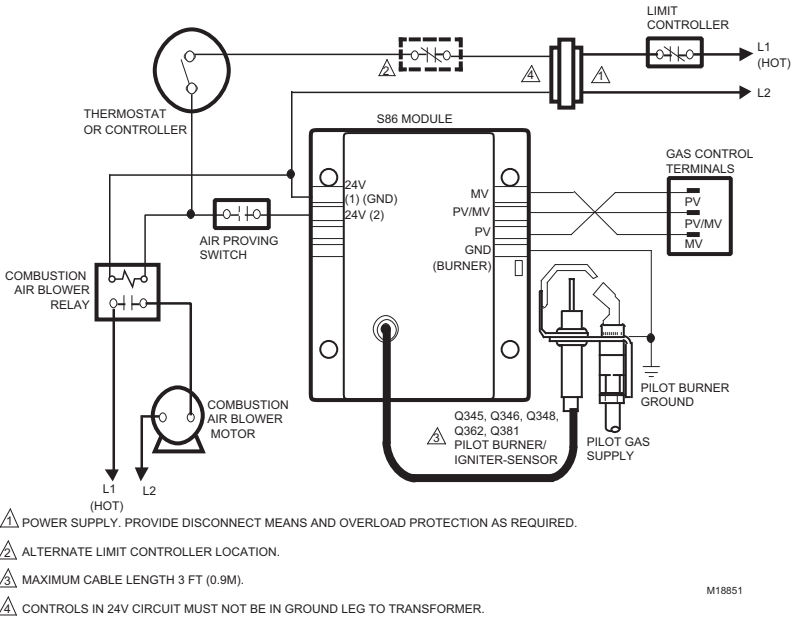


Fig. 7. Wiring connections for 24 volt control in intermittent ignition system with S86.

## STARTUP AND CHECKOUT

### ⚠️ WARNING

**Fire or Explosion Hazard**  
Can cause property damage, severe injury, or death.

1. Do not force the gas control knob. Use only your hand to turn the gas control knob. Never use any tools.
2. If the gas control knob will not operate by hand, call a qualified service technician to replace the gas control.

### Gas Control Knob Settings

The gas control knob settings are as follows:

OFF prevents pilot and main gas flow through the control.

ON permits gas to flow into the control body. Under control of the thermostat and intermittent pilot module, gas can flow to the pilot and main burners.

NOTE: Controls are shipped with the gas control knob in the ON position.

### Turn On System

Rotate the gas control knob counterclockwise ↶ to ON.

### Turn On Main Burner

Follow instructions provided by appliance manufacturer or turn up thermostat to call for heat.

### Perform Gas Leak Test

### ⚠️ WARNING

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

Check for gas leaks with soap and water solution any time work is done on a gas module.

### Gas Leak Test

1. Paint pipe connections upstream of gas control with rich If a gas leak is detected, tighten the pipe connection.
2. If leak is detected, tighten pipe connections.
3. Stand clear of main burner while lighting to prevent injury caused from hidden leaks which could cause flashback in the appliance vestibule. Light main burner.
4. With main burner in operation, pain pipe joints (including adapters) and control inlet and outlet with rich soap and water solution.
5. If another leak is detected, tighten adapter screws, joints, and pipe connections.
6. Replace part if leak can't be stopped.

## Adjust Pilot Flame

The pilot flame should envelop 3/8 to 1/2 in. [10 to 13 mm] of the tip of the igniter-sensor. See Fig. 8.

1. Remove pilot adjustment screw clockwise  to decrease or counterclockwise  to increase pilot flame.
2. Replace cover screw after adjustment to prevent gas leakage.

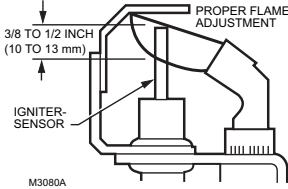


Fig. 8. Proper flame adjustment.



## Check and Adjust Gas Input to Main Burner



### CAUTION

1. Do not exceed the input rating stamped on the appliance nameplate, or manufacturer recommended burner orifice pressure for the size orifice(s) used. Make certain the primary air supply to the main burner is properly adjusted for complete combustion (refer to the appliance manufacturer instructions).
2. IF CHECKING GAS INPUT BY CLOCKING THE GAS METER:
  - Make sure that the only gas flow through the meter is that of the appliance being checked.
  - Other appliances must remain off with their pilots extinguished (or their consumption must be deducted from the meter reading).
  - Convert the flow rate to Btuh as described in form 70-2602, Gas Controls Handbook, and compare to the Btuh input rating on the appliance nameplate.
3. IF CHECKING GAS INPUT WITH A MANOMETER (PRESSURE GAUGE):
  - Make certain gas control is in PILOT position before removing outlet pressure tap plug to connect manometer (pressure gauge).
  - Also turn gas control knob back to PILOT when removing gauge and replacing plug. Before removing inlet pressure tap plug, shut off gas supply at the manual valve in the gas piping to the appliance or, for LP, at the tank.
  - Also shut off gas supply before disconnecting manometer and replacing plug. Repeat Gas Leak Test at plug with main burner operating.

## Standard Pressure Regulator

1. Check the manifold pressure listed on the appliance nameplate. Gas control outlet pressure should match the nameplate.
2. With main burner operating, check gas control flow rate using the meter clogging method or pressure using a manometer connected to the outlet pressure tap on the gas control. Refer to Fig. 4.
3. If necessary, adjust pressure regulator to match appliance rating. Refer Table 3 for factory set nominal outlet pressure and adjustment range.
  - a. Remove the pressure regulator adjustment cap and screw.
  - b. Using a screwdriver, turn the inner adjustment screw clockwise  to increase or counterclockwise  to decrease the main burner gas pressure.
  - c. Always replace the cap screw and tighten firmly to safeguard proper operation.
4. If desired outlet pressure or flow rate cannot be achieved by adjusting the control, check the control inlet pressure using a manometer at the inlet pressure tap. If inlet pressure is in normal range (refer to Table 3), replace the control. Otherwise, take the necessary steps to provide proper gas pressure on the control.

## Check Safety Shutdown Performance



### WARNING

#### Fire or Explosion Hazard

Can cause property damage, severe injury, or death.

Perform the safety shutdown test anytime work is done on a gas system.

NOTE: Read steps 1-7 below before starting and compare to the safety shutdown or safety lockout tests recommended for the intermittent pilot (IP) module. Where they differ, use the procedure recommended for the module.

1. Turn off gas supply.
2. Set the thermostat or controller above room temperature to call for heat.
3. Watch for spark at pilot burner either immediately or following prepurge. See IP module specifications.
4. If module has timed ignition, time length of spark operation. See IP module specifications.
5. After the module locks out, open manual gas control knob and make sure no gas is flowing to pilot or main burner.

With modules that continue spark until pilot lights or system is shut down manually, pilot should light when manual gas control knob is opened.

6. Set the thermostat below room temperature and wait one minute.
7. Operate system through one complete cycle to make sure all controls operate properly.

Table 3. Pressure Regulator Specification Pressures in Inches WC.

Model	Type of Gas	Nominal Inlet Pressure Range	Outlet Pressure			
			Nominal Factory Outlet Setting		Adjustment Setting Range	
			Step	Full Rate	Step	Full Rate
Standard	Natural	5.0 - 7.0	—	3.5	—	3.0 - 5.0
	LP	12.0 - 14.0	—	10.0	—	8.0 - 12.0

Table 4. Pressure Regulator Specification Pressures in kPa.

Model	Type of Gas	Nominal Inlet Pressure Range	Outlet Pressure			
			Nominal Factory Outlet Setting		Adjustment Setting Range	
			Step	Full Rate	Step	Full Rate
Standard	Natural	1.2 - 1.7	—	0.9	—	0.7 - 1.2
	LP	2.9 - 3.9	—	2.7	—	2.0 - 3.0

## SERVICE

### WARNING

**Fire or Explosion Hazard**  
Can cause property damage, severe injury, or death.  
Do not take this control apart; it contains no replaceable components. Attempts disassembly or repair may damage the control.

### CAUTION

Do not apply a jumper across (or short) the valve coil terminals, even temporarily. Doing so may burn out the heat anticipator in the thermostat or damage the electronic module.

### If Main Burner Will not Come On with Call for Heat

1. Confirm that the gas control knob is in the ON position.
2. Adjust the thermostat several degrees above room temperature.
3. Using ac voltmeter, check for 24 V at gas control.
  - If pilot lights, measure across MV/PV and MV.
  - If pilot does not light, measure across MV/PV and PV before safety lockout occurs.
4. If voltage is incorrect or not present, check control circuit for proper operation.
5. If 24 V is present, replace gas control.

## Instructions To The Homeowner (For Your Safety, Read Before Operating)

### WARNING

**Fire or Explosion Hazard**  
Can cause property damage, severe injury, or death.

Follow the warnings below and the lighting instructions exactly.


1. Before lighting, smell all around the appliance area for gas. If the appliance uses LP (Bottled gas, also be sure to smell next to the floor because LP gas is heavier than air. If you smell gas, immediately shut off the manual valve in the gas piping to the appliance or, ON LP, AT THE TANK. DO NOT TRY TO LIGHT ANY APPLIANCE. Don't touch any electrical switch or use the phone. LEAVE THE BUILDING and call your gas supplier. If your gas supplier cannot be reached, call the fire department.
2. Do not force the gas control knob on the appliance. Use only your hand to turn the gas control knob. Never use any tools. If the knob will not operate by hand, the control should be replaced by a qualified service technician. Force or attempted repair may result in fire or explosion.
3. The gas control must be replaced if it has been flooded with water. Call a qualified service technician.
4. The gas control is a safety device. It must be replaced in case of any physical damage such as bent terminals, missing or broken parts, stripped threads or evidence of exposure to heat.

### IMPORTANT:


*Follow the operating instructions provided by manufacturer of you heating appliance. The information below will be of assistance in a typical control application, but the specific controls used and the procedures outlined by the manufacturer of your appliance may differ, requiring special instructions.*

## TO TURN ON FURNACE


### STOP: Read the Warnings Above

1. The lighting sequence on this appliance is automatic; DO NOT ATTEMPT TO MANUALLY LIGHT THE PILOT.
2. If the furnace does not come on when the thermostat is set several degrees above room temperature, set the thermostat to the bottom of its range to reset safety control.
3. Remove the burner access panel if provided on your appliance.
4. Turn the gas valve knob (Fig. 4) clockwise  to OFF.
5. Wait five minutes to allow any gas in the combustion chamber to vent. If you then smell gas in the appliance area or near the floor in an LP installation, immediately shut off the manual valve in the

gas piping to the appliance or, ON LP, AT THE TANK. Don't touch any electrical switch or use the phone. Do not try to light any appliance. LEAVE THE BUILDING and call your gas supplier. If your gas supplier cannot be reached, call the fire department. Failure to do so may result in fire or explosion.

6. If you don't smell gas, turn knob on gas control counterclockwise  to ON.
7. Replace burner access panel.
8. Reset thermostat to desired temperature.
9. If appliance will not operate, turn the gas control knob to OFF and contact a qualified service technician for assistance.

### Turning Off the Appliance

Turn gas control knob clockwise  to OFF.



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